Chapter 3.1 WATER QUALITY ASSESSMENT SUMMARY

Virginia has nine major river basins with an estimated 51,016 miles of perennial rivers and streams and approximately 2,305 square miles of estuaries. These figures were calculated utilizing the Environmental Protection Agency (EPA) National Hydrography Database (NHD). This new and improved hydrography database has provided additional geographical refinement of rivers, streams, lakes and estuarine waters in Virginia.

The overall water quality for Virginia is assessed based on whether or not the condition of the waterbody being assessed permits citizens to safely enjoy the designated uses of the waters as described in the Virginia Water Quality Standards. Table 3.1-1 briefly describes the primary designated uses and the baseline criteria used in this assessment to demonstrate support of the designated uses. Several additional aquatic life sub-uses have been adopted for the Chesapeake Bay and the tidal tributaries. Additional information relative to the Chesapeake Bay and tidal tributaries can be found in Chapter 6.7

Table 3.1-1 DESIGNATED USE MATRIX

NO.	DESIGNATED USE	SUPPORT OF USE DEMONSTRATED BY
1	Aquatic Life Use	Conventional Pollutants (Dissolved Oxygen, pH, Temp.); Toxic contaminants in water column; Nutrients and toxic contaminants found in sediments; Biological evaluation.
2	Fish Consumption Use	Advisories, limiting consumption, or restrictions issued by Virginia Department of Health (VDH); Comparison of fish tissue data to state screening values for toxic pollutants found in Appendices E1 and E2 of the 2008 Water Quality Assessment Guidance Manual
3	Shellfish Consumption Use	Restrictive actions for harvesting and marketing of shellfish resources made by the VDH Div. of Shellfish Sanitation due to contamination.
4	Recreation (Swimming) Use	Conventional Pollutants, (Fecal Coliform, E. coli and enterococci); beach advisories/closures issued by VDH
5	Public Water Supply Use	Closures or advisories by VDH; comparison of data to applicable public water supply Standards
6	Wildlife Use	Aquatic life toxics criteria in water column

The six-year assessment begins by analyzing all quality assurance/quality control (QA/QC) approved data from DEQ ambient water quality, biological, sediment and fish tissue monitoring, special studies and/or other non-DEQ water quality data, including citizen monitoring data. Non-agency monitoring data is evaluated for use in the assessment using a process outlined in Part VI, Section 6.3.1 of the 2008 Assessment Guidance Manual. The results of these comprehensive data analyses are compared to both numeric and narrative criteria related to the designated uses contained in the Water Quality Standards (WQS). The WQS are provisions of State and/or Federal regulations that contain numeric and narrative criteria for protecting the designated uses of all waters in the Commonwealth.

In performing the assessment of chemical data summarized in this report, DEQ used the Percent Method with a slight modification for small datasets. For additional information on the methodologies used in the assessment, see Chapter 2.2 of this report or the 2008 Water Quality Assessment Guidance Manual found on the DEQ website at http://www.deq.virginia.gov/wqa/.

Many aspects of this assessment process are the same as previous assessments, but several changes or enhancements have been implemented for this reporting period. First and foremost, the overall assessment of water quality has incorporated a six-year assessment window (January 1, 2001 to December 31, 2006). Earlier assessments had been based on a five-year period, but this was changed to correspond

with the rotating watershed monitoring strategy which rotates to approximately 1/3 of all watersheds every two years, culminating in all watersheds within the Commonwealth being monitored every six years.

As in 2006, the 2008 fish tissue assessment has assessed two or more exceedences of the same toxic criterion based tissue value (TV) at a site as impaired since the TV's are directly calculated from the "human health" Water Quality Criteria for Surface Waters (9 VAC 25-260-140). For additional information regarding fish tissue assessment, see Section 6.5.2 of the 2008 Water Quality Assessment Guidance Manual.

In addition to the previously described assessment enhancements, revisions to the 305(b)/303(d) guidance manual have improved assessment quality and consistency among DEQ offices and programs. Additionally, the assessment guidance manual provides the public an opportunity to review and comment on the assessment criteria used by DEQ to determine designated use attainment. The draft manual was public noticed in March 2007 and DEQ received public comments on the updated draft manual. Additional revisions/clarifications were made to the draft guidance manual based on comments received. DEQ released the final 2008 Guidance Manual in June 2007.

If chemical, biological or tidal waters monitoring data cannot be used directly in the assessment process due to QA/QC concerns or other methodology inconsistencies, the appropriate DEQ staff will provide the data generator an explanation for the data not being useable. Additionally, DEQ will not use data for listing waters as impaired if the data generator has not granted authority to use such data for listing. A list of all data providers and the status of the QA/QC review is included in Appendix D of the 2008 Integrated Report.

Water quality results and predictions from the first phase of freshwater probabilistic monitoring (ProbMon) have been included in the 2008 Integrated Report. See Chapter 2.4 for additional information regarding the results of ProbMon assessment during this reporting period.

Statewide summaries of the river miles, estuarine square miles, and lake/reservoir acres within and bordering Virginia are presented in Tables 3.1-2 through 3.1-4. Support of the overall uses for each waterbody was determined by examining the support of up to six designated uses (see Table 3.1-5), as appropriate, for each waterbody.

As in previous 305(b) assessment reports, conventional pollutant data (DO, pH, temperature, bacteria and nutrients) continued to make up the bulk of the data used. Conventional pollutant data were collected and assessed from DEQ monitoring stations along with QA/QC-approved monitoring data from other federal, state, municipal and citizen monitoring programs and compared to Virginia's Water Quality Standards. In non-tidal waters, DEQ used the percentage procedure to determine the degree of use support for conventional pollutant data. In tidal waters, a cumulative frequency distribution methodology was used for Chesapeake Bay related conventional pollutant assessment. See Section 6.4.2 of the 2008 Assessment Guidance Manual for more details.

The assessment is objective except where professional judgment indicates that natural causes are responsible for the violations or the data quality is suspect. For the 2008 assessment cycle, Virginia used the newly approved criteria for man-made lakes and reservoirs to protect aquatic life and recreational designated uses from the impacts of nutrients (9 VAC 25-260-187 for chlorophyll *a* and dissolved oxygen (DO) assessments). For DO, the instantaneous minimum standard found in 9 VAC 25-260-50 (see Table 2.1-1), was used to assess compliance. A description of the types of data and the acceptable criteria used to determine the proper degree of use support for each water type and subsequent Category designation is described in Chapter 2.2 of this report. It should be noted that a single "overall" Category or Subcategory is assigned to each segment or assessment unit (AU). Since each AU has multiple designated uses, the worst case Category (Category 5) for any designated use will override all other Categories for the overall segment determination.

Table 3.1-5 provides a summary of all waters assessed for each of the designated uses. Total size of Virginia's rivers and streams was calculated to be approximately 51,016 miles. For the 2008 assessment, DEQ once again used the Assessment Database (ADB v2.2.1) that EPA has provided to the states. The database is based on designating an overall assessment category for each waterbody or assessment unit. Each designated use that has associated monitoring data is evaluated and an overall assessment category is

determined based on the results of the individual designated use results. As previously pointed out, Category 5 (impaired and needing a TMDL) overrides all other categories in the overall assessment unit determination.

As previously stated, additional geographical re-indexing and use of the National Hydrologic Database (NHD) has slightly increased the actual number of stream miles within the state from previous reports. The stream mile delineation guidance has provided basic guidelines to the regional assessment staff for associating the mileage assessed, relative to a specific sampling station. This is especially important where there are no easily identifiable changes in watershed characteristics. In some cases, the stream miles associated with a sampling station have been conservatively reduced from previous assessment reports. In other cases, additional monitoring stations have been added in the watershed and may increase the size of some impaired segments depending on the additional data collected and assessed. The stream mile delineations found in this report are only reflective of the 2008 assessment period but follow closely with the monitoring efforts reported in previous reports.

The total size of estuarine waters was approximately 2,305 square miles after creating a DEQ GIS coverage. Coverage of coastal shore miles remained at 120 linear shore miles. An increased effort to assess one or more designated uses in the 100+ most significant public lakes was accomplished. A total of 115,835 significant reservoir/lake acres were calculated to exist in Virginia. For the 2008 assessment, any lake or reservoir which had been included in the original hydrologic dataset but was not considered to be significant, or which was not included in 9 VAC 25-260-187 and had never been assessed was removed from the dataset. Table 3.1-5 summarizes the overall designated use assessments of Virginia's waters to determine the degree of use support for aquatic life, fish consumption, shellfish consumption (where applicable), recreation, public water supply (where applicable) and wildlife uses. Table 3.1-6 lists the causes for those waters resulting in less than full support of the Clean Water Act goals and state Water Quality Standards.

Impairment causes and/or sources can be a “major impact”, defined as that which causes a significant impairment to the waterbody, or moderate and minor impacts individually or in combination. Normally, a major impact would be from a sole source with a large pollutant(s) contribution. Moderate and/or minor impacts have a slight to moderate effect on the waters and may be from a single moderate contributor or a combination of several minor contributors. It is important to note that moderate and minor impacts can, under certain conditions, work in conjunction to cause a major impact.

As previously stated, the causes and sources of use impairment of Virginia's waters resulting in less than full support of Clean Water Act goals are summarized in Tables 3.1-6 and 3.1-7. It is apparent that urban runoff and agricultural nonpoint sources are primary contributors of use impairment and major impacts. It is also important to point out that natural conditions can have a major impact on water quality. Equally apparent, the primary pollutants causing use impairment are: low dissolved oxygen from nutrient enrichment or natural stratification; pH and DO problems associated with natural, low-flow, swamp waters; pathogen indicators; and human health-related Polychlorinated Biphenyls (PCBs) and mercury found in fish tissue. The assessment of the probabilistic estuarine B-IBI (benthic) data during this reporting period was used again in 2008 and has resulted in aquatic life impairment in some estuarine waters. Additionally, assessment of the BEACH Program data collected by the Virginia Department of Health (VDH) has identified one particular public swimming area of concern.

For the 2008 assessment, a new pH standard associated with Class VII “swamp waters” was adopted by the SWCB and became effective on February 12, 2004. Since the adoption of the Class VII pH Standard in 2004, new studies on many swamp waters in the eastern part of the state have shown a need to further refine the pH criteria for these waters and new criteria have been proposed in the current triennial review of WQ Standards. Many of these swamp waters have been identified as naturally impaired, based on the current pH criteria, but will likely meet the new Standard and be delisted in upcoming assessments.

Assessment Results

In the 2008 assessment, DEQ incorporated the Integrated Reporting guidance which EPA developed in 2005 and further refined in 2007. The assessment approach used in this report is similar to the 2006 assessment and is designed to integrate or combine the 305(b) overall assessment of Virginia's waters and include those waters impaired and needing a TMDL (Total Maximum Daily Load) as per 303(d). As previously stated, the EPA 2008 Integrated Report guidance and Assessment Database (ADB v2.2.1) has five different overall categories in which every segment or "assessment unit" (AU) will be placed. The EPA Integrated Report guidance allows the states to further sub-divide the federal Categories in order to address state programmatic needs. Virginia created several additional subcategories in order to facilitate tracking. Tables, 3.1-2, 3.1-3, and 3.1-4 show the assessment results by waterbody type using all assessment categories and subcategories applicable for Virginia's 2008 Integrated Report.

Additional information regarding assessment methodologies and subcategories can be found in Chapter 2.2 of this report or the 2008 Assessment Guidance Manual found on the DEQ water website at http://www.deq.virginia.gov/wqa/

Table 3.1-2 Assessment Results for Rivers

Degree of Use Support	Water Type	Total Miles *(Rounded to the Nearest Whole Number)*	(%)
Fully Support All Designated Uses **(EPA Category 1)**	River (mi.)	**32**	0.1%
Virginia Subcategory 1A		0	
Fully Support Some Uses but Insufficient Data to Assess All Uses **(EPA Category 2)**	River (mi.)	**5,408**	10.6%
Virginia Subcategory 2A		3,556	
Virginia Subcategory 2B		1,773	
Virginia Subcategory 2C		80	
Insufficient Data to Determine if any Uses are Being Met **(EPA Category 3)**	River (mi.)	**35,033**	68.7%
Virginia Subcategory 3A		34,035	
Virginia Subcategory 3B		446	
Virginia Subcategory 3C		309	
Virginia Subcategory 3D		244	
Waters are Impaired or Threatened but do not need a TMDL **(EPA Category 4)**	River (mi.)	**2,413**	4.7%
EPA Subcategory 4A		1,824	
EPA Subcategory 4B		6	
EPA Subcategory 4C		583	
Waters are Impaired or Threatened and need a TMDL **(EPA Category 5)**	River (mi.)	**8,130**	15.9%
Virginia Subcategory 5A		6,975	
Virginia Subcategory 5B		0	
Virginia Subcategory 5C		489	
Virginia Subcategory 5D		666	
Virginia Subcategory 5E		0	
Virginia Subcategory 5F		0	
Total Size	River (mi.)	**51,016**	100%

Table 3.1-3 Assessment Results for Significant Lakes/Reservoirs

Degree of Use Support	**Water Type**	**Total Acres** ***(Rounded to the Nearest Whole Number)***	**(%)**
Fully Support All Designated Uses **(EPA Category 1)**	Lakes (acres)	0	0.0%
Virginia Subcategory 1A		0	
Fully Support Some Uses but Insufficient Data to Assess All Uses **(EPA Category 2)**	Lakes (acres)	**18,266**	15.8%
Virginia Subcategory 2A		16,330	
Virginia Subcategory 2B		1,935	
Virginia Subcategory 2C		0	
Insufficient Data to Determine if any Uses are Being Met **(EPA Category 3)**	Lakes (acres)	**3,526**	3.0%
Virginia Subcategory 3A		3,498	
Virginia Subcategory 3B		28	
Virginia Subcategory 3C		0	
Virginia Subcategory 3D		0	
Waters are Impaired or Threatened but do not need a TMDL **(EPA Category 4)**	Lakes (acres)	**1,474**	1.3%
EPA Subcategory 4A		0	
EPA Subcategory 4B		1,381	
EPA Subcategory 4C		93	
Waters are Impaired or Threatened and need a TMDL **(EPA Category 5)**	Lakes (acres)	**92,570**	79.9%
Virginia Subcategory 5A		90,319	
Virginia Subcategory 5B		0	
Virginia Subcategory 5C		1,021	
Virginia Subcategory 5D		1,230	
Virginia Subcategory 5E		0	
Virginia Subcategory 5F		0	
Total Size	Lakes (acres)	**115,835**	100%

Table 3.1-4 Assessment Results for Estuarine Waters

Degree of Use Support	**Water Type**	**Total Square Miles** ***(Rounded to the Nearest Whole Number)***	**(%)**
Fully Support All Designated Uses **(EPA Category 1)**	Estuary (sq. mi.)	**0**	0.0%
Virginia Subcategory 1A		0	
Fully Support Some Uses but Insufficient Data to Assess All Uses **(EPA Category 2)**	Estuary (sq. mi.)	**123**	5.3%
Virginia Subcategory 2A		122	
Virginia Subcategory 2B		1	
Virginia Subcategory 2C		0	
Insufficient Data to Determine if any Uses are Being Met **(EPA Category 3)**	Estuary (sq. mi.)	**0**	0.0%
Virginia Subcategory 3A		0	
Virginia Subcategory 3B		0	
Virginia Subcategory 3C		0	
Virginia Subcategory 3D		0	
Waters are Impaired or Threatened but do not need a TMDL **(EPA Category 4)**	Estuary (sq. mi.)	**0**	0.0%
EPA Subcategory 4A		0	
EPA Subcategory 4B		0	
EPA Subcategory 4C		0	
Waters are Impaired or Threatened and need a TMDL **(EPA Category 5)**	Estuary (sq. mi.)	**2,182**	94.6%
Virginia Subcategory 5A		2,119	
Virginia Subcategory 5B		1	
Virginia Subcategory 5C		18	
Virginia Subcategory 5D		42	
Virginia Subcategory 5E		0	
Virginia Subcategory 5F		1	
Total Size	Estuary (sq. mi.)	**2,305**	100%

Table 3.1-5 OVERALL INDIVIDUAL USE SUPPORT SUMMARY TABLE

Size: ***All Sizes Rounded to the Nearest Whole Number***

Rivers - 51,016 miles
Lakes - 115,835 acres
Estuaries - 2,305 sq. miles

Designated Use	Water Body Type	Fully Supporting	Total Impaired	Naturally Impaired	Insufficient Information	Not Assessed	Size Assessed
Aquatic Life	River (mi.)	9,988	4,154	1,175	1,271	35,603	14,142
	Lakes (acres)	52,266	59,528	2,954	90	3,951	111,794
	Estuary (sq. mi.)	93	2,155	2	9	48	2,248
Fish Consumption	River (mi.)	2,633	2,088	0	246	46,048	4,722
	Lakes (acres)	19,202	76,933	0	416	19,285	96,134
	Estuary (sq. mi.)	38	2,067	0	10	188	2,106
Public Water Supply	River (mi.)	1,432	2	0	19	7,791	1,434
	Lakes (acres)	73,026	0	0	0	16,888	73,026
	Estuary (sq. mi.)	6	0	0	0	1	6
Recreation	River (mi.)	3,651	7,391	0	935	39,038	11,043
	Lakes (acres)	96,231	5,061	0	1,060	13,482	101,292
	Estuary (sq. mi.)	489	87	0	59	1,670	577
Shellfishing	River (mi.)	NA	NA	NA	NA	NA	NA
	Lakes (acres)	NA	NA	NA	NA	NA	NA
	Estuary (sq. mi.)	1,900	98	0	0	10	1,997
Wildlife	River (mi.)	12,030	36	0	145	38,805	12,066
	Lakes (acres)	105,758	574	0	0	9,504	106,332
	Estuary (sq. mi.)	302	86	0	1	1,916	388

Chesapeake Bay Designated Uses

Open-Water Aquatic Life	Estuary (sq. mi.)	79	1,681	0	401	0	1,760
Deep-Water Aquatic Life	Estuary (sq. mi.)	12	440	0	170	0	452
Deep-Channel Seasonal Refuge	Estuary (sq. mi.)	0	253	0	0	2	253
Shallow-Water Submerged Aquatic Vegetation	Estuary (sq. mi.)	213	1,916	0	0	0	2,129
Migratory Fish Spawning and Nursery	Estuary (sq. mi.)	0	0	0	5	337	0

Table 3.1-6 WATERS IMPAIRED BY VARIOUS CAUSE CATEGORIES

Pollutant	Water Body Type	Impaired Size *(Rounded to the Nearest Whole Number)*
Aldrin	River (mi.)	6
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Ammonia (Un-ionized)	River (mi.)	3
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Aquatic Plants (Macrophytes)	River (mi.)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	1,916
Benthic-Macroinvertebrate Bioassessments	River (mi.)	1,702
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Benzo[k]fluoranthene	River (mi.)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	1
Cadmium	River (mi.)	5
	Lakes (acres)	26
	Estuary (sq. mi.)	0
Chlordane	River (mi.)	2
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Chloride	River (mi.)	42
	Lakes (acres)	0
	Estuary (sq. mi.)	141
Chlorophyll-a	River (mi.)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	202
Copper	River (mi.)	10
	Lakes (acres)	574
	Estuary (sq. mi.)	0
DDE/DDT	River (mi.)	19
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Dissolved Oxygen	River (mi.)	1,509
	Lakes (acres)	58,477
	Estuary (sq. mi.)	1,856
Enterococcus	River (mi.)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	47
Escherichia coli	River (mi.)	5,981
	Lakes (acres)	5,061
	Estuary (sq. mi.)	37
Estuarine Bioassessments	River (mi.)	NA
	Lakes (acres)	NA
	Estuary (sq. mi.)	388

Pollutant	Water Body Type	Impaired Size *(Rounded to the Nearest Whole Number)*
Fecal Coliform	River (mi.) Lakes (acres) Estuary (sq. mi.)	2,183 0 98
Heptachlor epoxide	River (mi.) Lakes (acres) Estuary (sq. mi.)	14 0 0
Lead	River (mi.) Lakes (acres) Estuary (sq. mi.)	13 26 0
Mercury in Fish Tissue	River (mi.) Lakes (acres) Estuary (sq. mi.)	1,344 38,493 8
Nitrogen, Nitrate	River (mi.) Lakes (acres) Estuary (sq. mi.)	2 0 0
Nutrient/Eutrophication Biological Indicators	River (mi.) Lakes (acres) Estuary (sq. mi.)	0 0 8
PCB in Fish Tissue	River (mi.) Lakes (acres) Estuary (sq. mi.)	1,018 72,289 2,063
Polychlorinated biphenyls (PCBs)	River (mi.) Lakes (acres) Estuary (sq. mi.)	3 0 0
pH	River (mi.) Lakes (acres) Estuary (sq. mi.)	1,290 5,132 6
Sediment Bioassays for Estuarine and Marine Water	River (mi.) Lakes (acres) Estuary (sq. mi.)	NA NA 1
Temperature, water	River (mi.) Lakes (acres) Estuary (sq. mi.)	384 99 0
Tributylin TBT (Tributylstanne)	River (mi.) Lakes (acres) Estuary (sq. mi.)	0 0 11
Zinc	River (mi.) Lakes (acres) Estuary (sq. mi.)	9 26 0

Table 3.1-7 WATERS IMPAIRED BY VARIOUS SOURCE CATEGORIES

Source of Impairment	Water Body Type	Impaired Size *(Rounded to the Nearest Whole Number)*
Acid Mine Drainage	River (mi.)	27
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Agriculture	River (mi.)	1,130
	Lakes (acres)	0
	Estuary (sq. mi.)	2,091
Animal Feeding Operations	River (mi.)	293
	Lakes (acres)	103
	Estuary (sq. mi.)	0
Aquaculture	River (mi.)	3
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Atmospheric Deposition - Acidity	River (mi.)	199
	Lakes (acres)	400
	Estuary (sq. mi.)	0
Atmospheric Deposition - Nitrogen	River (mi.)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	2,091
Atmospheric Deposition - Toxics	River (mi.)	508
	Lakes (acres)	1,162
	Estuary (sq. mi.)	12
Changes in Ordinary Stratification and Bottom Water Hypoxia/Anoxia	River (mi.)	0
	Lakes (acres)	914
	Estuary (sq. mi.)	4
Channel Erosion/Incision from Upstream Hydromodifications	River (mi.)	11
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Channelization	River (mi.)	20
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Clean Sediments	River (mi.)	25
	Lakes (acres)	0
	Estuary (sq. mi.)	1,916
Coal Mining	River (mi.)	33
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Coal Mining (Subsurface)	River (mi.)	23
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Combined Sewer Overflows	River (mi.)	50
	Lakes (acres)	0
	Estuary (sq. mi.)	8
Commercial Districts (Industrial Parks)	River (mi.)	3
	Lakes (acres)	0
	Estuary (sq. mi.)	0

Source of Impairment	Water Body Type	Impaired Size *(Rounded to the Nearest Whole Number)*
Contaminated Sediments	River (mi.)	196
	Lakes (acres)	0
	Estuary (sq. mi.)	36
Crop Production	River (mi.)	12
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Dam or Impoundment	River (mi.)	64
	Lakes (acres)	1,687
	Estuary (sq. mi.)	0
Discharges from Municipal Separate Storm Sewer Systems (MS4)	River (mi.)	138
	Lakes (acres)	0
	Estuary (sq. mi.)	24
Drought-related Impacts	River (mi.)	30
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Erosion from Derelict Land	River (mi.)	7
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Grazing in Riparian or Shoreline Zones	River (mi.)	504
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Illicit Connections/Hook-ups to Storm Sewers	River (mi.)	13
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Impacts from Abandoned Mine Lands	River (mi.)	21
	Lakes (acres)	26
	Estuary (sq. mi.)	0
Impacts from Land Application of Wastes	River (mi.)	141
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Impervious Surface/Parking Lot Runoff	River (mi.)	12
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Inappropriate Waste Disposal	River (mi.)	10
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Industrial Point Source Discharge	River (mi.)	175
	Lakes (acres)	0
	Estuary (sq. mi.)	2,117
Industrial/Commercial Site Stormwater Discharge	River (mi.)	22
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Internal Nutrient Recycling	River (mi.)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	2,091

Source of Impairment	Water Body Type	Impaired Size *(Rounded to the Nearest Whole Number)*
Lake Fertilization	River (mi.)	2
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Landfills	River (mi.)	5
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Leaking Underground Storage Tanks	River (mi.)	1
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Livestock Grazing or Feeding Operations	River (mi.)	1,797
	Lakes (acres)	1,026
	Estuary (sq. mi.)	0
Loss of Riparian Habitat	River (mi.)	240
	Lakes (acres)	0
	Estuary (sq. mi.)	2,091
Managed Pasture Grazing	River (mi.)	7
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Manure Runoff	River (mi.)	42
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Mine Tailings	River (mi.)	6
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Municipal (Urbanized High Density Area)	River (mi.)	534
	Lakes (acres)	898
	Estuary (sq. mi.)	7
Municipal Point Source Discharges	River (mi.)	205
	Lakes (acres)	0
	Estuary (sq. mi.)	2,117
Natural Conditions - Water Quality Standards Use Attainability Analyses Needed	River (mi.)	1,867
	Lakes (acres)	4,259
	Estuary (sq. mi.)	142
Natural Sources	River (mi.)	10
	Lakes (acres)	93
	Estuary (sq. mi.)	8
Non-Point Source	River (mi.)	1,884
	Lakes (acres)	88
	Estuary (sq. mi.)	261
On-site Treatment Systems	River (mi.)	986
	Lakes (acres)	940
	Estuary (sq. mi.)	7
Other Shipping Releases (Wastes and Detritus)	River (mi.)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	11

Source of Impairment	Water Body Type	Impaired Size *(Rounded to the Nearest Whole Number)*
Package Plant or Other Permitted Small Flows Discharges	River (mi.) Lakes (acres) Estuary (sq. mi.)	3 0 0
Post-development Erosion and Sedimentation	River (mi.) Lakes (acres) Estuary (sq. mi.)	44 0 0
Rangeland Grazing	River (mi.) Lakes (acres) Estuary (sq. mi.)	11 0 0
Residential Districts	River (mi.) Lakes (acres) Estuary (sq. mi.)	64 952 0
Runoff from Forest/Grassland/Parkland	River (mi.) Lakes (acres) Estuary (sq. mi.)	185 0 0
Rural Residential Areas	River (mi.) Lakes (acres) Estuary (sq. mi.)	424 103 0
Sanitary Sewer Overflows	River (mi.) Lakes (acres) Estuary (sq. mi.)	92 350 0
Sediment Resuspension (Clean Sediment)	River (mi.) Lakes (acres) Estuary (sq. mi.)	158 0 1,916
Sediment Resuspension (Contaminated Sediment)	River (mi.) Lakes (acres) Estuary (sq. mi.)	15 0 0
Septage Disposal	River (mi.) Lakes (acres) Estuary (sq. mi.)	60 0 0
Sewage Discharges in Unsewered Areas	River (mi.) Lakes (acres) Estuary (sq. mi.)	257 0 0
Shipbuilding, Repairs, Drydocking	River (mi.) Lakes (acres) Estuary (sq. mi.)	0 0 11
Silviculture Harvesting	River (mi.) Lakes (acres) Estuary (sq. mi.)	15 0 0
Site Clearance (Land Development or Redevelopment)	River (mi.) Lakes (acres) Estuary (sq. mi.)	5 0 0
Source Unknown	River (mi.) Lakes (acres) Estuary (sq. mi.)	5,371 91,409 2,106

Source of Impairment	Water Body Type	Impaired Size *(Rounded to the Nearest Whole Number)*
Sources Outside State Jurisdiction or Borders	River (mi.)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	2,090
Streambank Modifications/Destabilization	River (mi.)	158
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Surface Mining	River (mi.)	67
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Unpermitted Discharge (Domestic Wastes)	River (mi.)	6
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Unspecified Domestic Waste	River (mi.)	1,237
	Lakes (acres)	1,290
	Estuary (sq. mi.)	0
Unspecified Urban Stormwater	River (mi.)	16
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Upstream Impoundments	River (mi.)	10
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Urban Runoff/Storm Sewers	River (mi.)	53
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Wastes from Pets	River (mi.)	675
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Waterfowl	River (mi.)	262
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Wet Weather Discharges (Non-Point Source)	River (mi.)	467
	Lakes (acres)	411
	Estuary (sq. mi.)	282
Wet Weather Discharges (Point Source)	River (mi.)	24
	Lakes (acres)	0
	Estuary (sq. mi.)	2,091
Wildlife Other than Waterfowl	River (mi.)	3,002
	Lakes (acres)	1,290
	Estuary (sq. mi.)	0